

BIOLOGICAL NOTES ON PLEOCOMA HIRTICOLLIS
VANDYKEI LINSLEY
(Coleoptera; Scarabaeidae)

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The discovery of this species in considerable numbers results in the establishment of a habitat new to the Pleocominae. Heretofore the known and recorded habitats were primarily in a forest association, secondarily in chaparral, now, for the first time, a habitat is known in the open, hilly grassland. The following fragmentary notes are therefore of interest.

COLLECTION DATA: January 21, 1944, near Patterson Pass, eastern Alameda County, California, three elytra of a *Pleocomma* were found at two ground squirrel middens by the authors. October 30, 37 ♂♂ were collected by E. G. Linsley and Ray F. Smith. November 4, 78 ♂♂ and 17 ♀♀ were collected by E. G. Linsley, A. E. Michelbacher, and the authors. November 14, A. E. Michelbacher and Ray F. Smith were unable to find specimens at the locality after a week of dry weather.

LOCALITY DATA: Approximately one-half mile east of summit of Patterson Pass, extending about one-fourth mile south and one-half mile north of road, altitude between 1,150 and 1,350 feet, in the rolling, grassy hills extending from Mount Diablo southward, forming the western boundary of the San Joaquin Valley.

The general aspect is of grass pasture land in an area of numerous hillocks, gentle slopes and small gullies. The entire area slopes in a more or less northeasterly direction, following a small intermittent tributary of Mountain House Creek. The drainage, in general, is good but one or two small ponds form in winter where there is no outlet to the stream.

The soil, as described by Cole, et. al.¹, belongs to the Linne series and the greater part of the area is a dark brownish hard adobe with some rock outcrop of the clay loam phase. Most of the females were taken near this latter, although they were not limited to this part of the area, being found south of the road as well.

¹ Cole, R. C., et. al., 1943. Soil Survey of the Tracy Area, California, U.S.D.A. Soil Survey Series 1938 (5):95 pp. illus., 1 map.

In the spring the entire area is covered by such plants as *Erodium*, *Echinocystis fabacea*, *Lupinus*, *Trifolium*, *Viola pedunculata*, *Broadiaea capitata*, *Ranunculus californicus*, and a number of grasses. As is common in this hilly area most of the pasture land is covered with introduced plants. It is not known whether this station has ever been cultivated, but the area has been pastured for at least three years. The rather deep gully alongside the station contained the characteristic stream border plants of this area, such as *Salix*, *Sambucus*, *Rosa*, etc.; however, the beetles were definitely not associated with any of these.

Ground squirrel burrows are common at the northern portion of the site and scattered everywhere. *Stenopelmatus* and spider holes are also exceedingly numerous.

Specimens were taken over a wide area, although they were more concentrated near the outcrop before mentioned and at and near a small gully to the south of the road.

WEATHER DATA: As previously recorded², emergence of certain *Pleocoma* depends on a soaking rain of about one-half inch or more. This proved true for *vandykei* as well. Records for the season of 1944 are as follows for nearby points:

DATE	LOCALITIES			
	Livermore	Young Ranch	Lathrop	2 mi. NE Livermore
October 20-21.	.09	.10	.04	.11
October 30-31.	.68	.85	1.01	.93
November 3-5.	1.09	.74	.72	.93
November 7.....	.27	.25	.23	.31

The Lathrop station is approximately 20 miles to the east in the San Joaquin Valley. The Livermore station is 9 miles to the west, on the other side of the hills. The Young Ranch is nearest to the locality and in a somewhat similar area 2.25 miles to the northwest.

In the Patterson Pass area there probably was a light rain of about a tenth of an inch on October 20 and 21. The second rain of the season, October 30 and 31, would have been about three-fourths of an inch, or more. The third rain, November 3 to 5, was about equal in precipitation.

MALE FLIGHT BEHAVIOR: Males were observed flying from 12:00 noon until 6:15 P.M., under conditions that varied from a

² Linsley, E. G. 1935. New Species of *Pleocoma* with notes concerning others. Pan-Pac. Ent., 11 (1) :14.

heavy rain to late afternoon sunshine to after dark, and from a slight breeze to a strong northwest wind. They appeared to be most abundant about the middle of the afternoon. On the whole, the weather was rather cold and threatening.

The normal flight pattern was a slow sweeping flight back and forth over the ground apparently in search for female burrows. These searching flights were made for about 50 to 200 yards mainly into the wind. Then a long, straight, return flight was made down wind and the searching flight would begin again. While going upwind the progress of the male *Pleocomma* was slow and one could keep up with them by walking slowly, but on the downwind flight one had to run hard to keep the beetle in sight. The entire flights were frequently of long duration. In one instance a male was followed on his route for over a mile. While searching, the males usually flew about twelve to eighteen inches or even less above the surface of the ground, but on the downwind flight they flew as high as ten to fifteen feet. When knocked to the ground by flying into plants they would crawl a few inches and then take wing again. Along toward dusk an occasional male would begin to dig into the soil. This was not in search of females, but in preparation for resting or spending the night. Apparently the males pass the night a few inches beneath the surface.

The males were not attracted to a Coleman lantern.

FEMALE BEHAVIOR: No females were found on October 30. On November 4, seventeen females were removed from their burrows. Most of the females were in the dry soil, i.e., below the penetration of the rain, at depths varying from about three to ten inches. Most of the holes were open, but in several instances the holes had been plugged. After copulation, the female apparently retreats to lower depths in the soil. There did not seem to be any special area where the females were concentrated. In several cases, one to four males were either in or near the female burrow. The diameter of a female burrow was measured as seven-eighths inches. In five instances cast pupal or larval skins were found at the bottom of the female hole.

LARVAE: While digging for the adults, four larvae were unearthed. These were of three sizes: the smallest, about three-eighths of an inch in length, the largest of a size approximately equal to that of the beetle, and two about midway between. This

would seem to indicate a life-cycle of more than one year for this species.

SUMMARY: It seems evident from our observations in this locality that *Pleocoma hirticollis vandykei* Linsley is a pasture land form. A rain of about one-half inch is apparently necessary to release the males in the fall. The males emerge before the females and search out their burrows. They enter the female tunnel to copulate. After copulation the female plugs her burrow and passes downward. The males spend the nights in small burrows which they dig each night. The life cycle is apparently of at least two or three years duration, the larvae feeding on one or another, or perhaps generally on the roots of the pasture-grassland plants.

ABUNDANCE OF *HYPERA PUNCTATA* (FABR.) IN 1945

Under usual conditions of weather and enemies, the clover-leaf weevil, *Hypera punctata* (Fabr.) never reaches a population level in California where it can do economic damage. The distribution and damage by this weevil have been discussed in a previous note (1944, Pan-Pac. Ent. 20 (3):120). At that time it was suggested that a fungous disease of the larvae which is very common in the winter and spring is associated with the low population levels. In all probability this disease is dependent on weather conditions for its effectiveness.

In the spring of 1945, the clover leaf weevil bred up in very large numbers on bur clover, *Medicago hispida*, at various stations in Contra Costa and Alameda counties. Larvae were very abundant in April and there was little fungous disease. The absence of the disease may be associated with the unusually dry and warm April. These larvae reached maturity near the end of April and early in May and adults were very abundant after the first week of May. The adults remained abundant in the grasslands for about three weeks or until the plants were completely dried up. At this time numerous complaints were received from home gardeners and others situated near the open uncultivated area. The adult weevils moved into the yards and houses in very large numbers and caused considerable annoyance. The adults were also observed collecting at watering troughs.

In 1944, a similar outbreak occurred in Scott Valley, Siskiyou County. In this case the clover leaf weevil caused considerable defoliation to alfalfa.—RAY F. SMITH AND A. E. MICHELbacher.